

## **Learning from students' experiences of IT courses**

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Paper published in *Computers in New Zealand Schools*, Vol 18, No 3, Nov 2006, pp.34-41

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## **Abstract**

The experiences of students in different types of specialist information technology (IT) classes, specifically classes in computer studies (CPS) and text and information management (TIM), vary considerably – both between classes and within the same class. However, there are common factors that define students' experiences, identified here as expectations, prior experience, pedagogy and classroom relations. Focusing on students' experiences raises questions and has implications for teachers in respect of classroom practice and curriculum development.

## **Introduction**

Students' experiences of specialist IT courses provide a lens through which to reflect on IT teaching practices. Specialist IT courses are defined here as courses where computers comprise both the content and mode of study. The factors that are identified as defining features of students' experience in IT subjects in this article are broadly delineated. Consequently, they can be seen to cross subject boundaries and to have general interest and applicability for IT teachers, although any one factor may be of greater or lesser significance within different curriculum and schooling contexts.

## **Thinking about experience**

Experience is a widely attributed but nebulous and problematic concept (Clandinin & Connelly, 1998). Experience can be defined as comprising both the activity in which someone engages and the meaning that he or she makes of that activity. In the context of specialist IT subjects, students' experiences of different subjects are defined by their activity around computers and the understandings they construct about this activity. These interpretations can be thought of in broad terms as more or less positive or negative. They are reflected in attitudinal factors relating to things such as likes, dislikes, self-confidence or self-efficacy and ideas about the worth of a subject or course.

It could be argued that individuals' experiences of an IT subject are necessarily unique, because individual students are unique, have different life and learning experiences with

computers and belong to different social groups. It could also be argued, though, that individuals in the same class have similar experiences, given that all in a class engage with the same curriculum in practice, as defined and presented by the teacher in a specific course. Thus there are individualistic and shared components to experience. The question, then, isn't whether students' experiences of IT subjects are different or similar, but whether there are common factors that help to define their experiences.

### **Research participants and school context**

The research participants whose experiences are described herein comprise 22 students from three classes – year 12 computer studies (12CPS), year 12 text and information management (12TIM) and year 10 text and information management (10TIM) – in a New Zealand secondary school, Kahikatea High School<sup>1</sup> (KHS) in 2001 (Abbiss, 2005). The 12CPS and 10TIM classes are mixed gender. The 12TIM class is an all-female group. The majority of participants are pakeha, but include Maori, Pacific Island and Chinese students. The school is conventional in its demographic features and specialist IT curriculum arrangements. It is a mid-decile, co-educational, urban, year 9 to 13 institution. In respect of the school's curriculum, the subjects offered – CPS and TIM – are those that comprise the most common specialist IT subjects in New Zealand secondary schools at the time of data collection. In 2005, CPS and TIM remain two of the most popular specialist IT subjects, both in respect of the number of students in years 9 to 13, 30468 students in CPS and 25650 in TIM, and the number of schools offering the subject, 339 and 225 schools respectively.<sup>2</sup>

### **Defining factors in students' experiences of CPS and TIM courses**

Individual students in the CPS and TIM classes at KHS construe their experiences in different terms and cover an attitudinal spectrum – positive, ambivalent, negative. However, there are recurrent themes in students' talk about their experiences of CPS and TIM courses. The defining factors of their experiences are expectations, prior experience, pedagogy, classroom relationships and performance. These factors are interconnected, but distinguishable. Underpinning these factors are broader social constructs, of which gender is a subtle but potent force.

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<sup>1</sup> Pseudonyms are used to protect the privacy of the research participants and school.

<sup>2</sup> Ministry of Education statistics for composite and secondary schools, by subjects and learning zone (year level at which the subject is taught), 1 July 2005.

## *Expectations*

There are two components to expectations. A key factor in students' experiences of IT subjects is the match between their expectations of a subject and the reality of the course presented to them. A related factor is the extent to which the content and skills that are presented in the course is perceived as relevant and is congruent with their post-school aspirations. These factors underpin students' feelings of pleasure, acceptance, disappointment and disgruntlement with CPS and TIM courses.

Ben, for example, is disappointed with the 12CPS course because it isn't what he expected it to be. His image of what CPS should be is a technical, computer science construction of the subject.

Ben:...computer students, sort of, sounded a lot more like you would learn more about the computers and putting them together, which I was *wrong*\_ I, I thought because\_ you know I thought it would teach me about the\_ the components and chucking them together and shit like, stuff like that...that's what I wanted but I didn't get that\_ Oh well.

Similarly, Lisa and Kathy are disgruntled with 12CPS because it doesn't meet their expectations, although their expectations are different to Ben's. Their ideas about what CPS should be are allied with office practice and general user conceptions of computing.

Lisa: Well I thought, you know how you get the big menus when you, I thought you would probably just go through and learn what like all of them were. Just like we could go into Word, go into Works, just learn the basic stuff.

Kathy: Yeah.

Lisa: And then you'd, he'd show us a different program and say this is the basic stuff in here, maybe give us a few exercises and then he'd choose basic stuff on something else and then we'd get to learn to use the Internet correctly, maybe, and\_ just basically learning more about the actual computer, not about making a computer program or\_ ... Not what's in it. Not like the technical\_ this is a motem [modem] or whatever, but just the programs and\_ And the different things that you can find on there and\_ yeah.

What Lisa and Kathy mean when they say that they expected to learn more about computers in 12CPS is that they want to learn how to use a range of applications related to document production, search engines for the Internet, and to develop their keyboarding skills. For them, leaning more about all the "stuff" that is in the computer doesn't mean learning about the hardware, operating systems or programming. Rather, it means being exposed to different versions of generic computer packages, such as MSWord, and functions available in the application menus.

These girls react negatively to the programming component of the 12CPS course because they see no relevance for programming in their lives. Lisa wants to pursue a career in broadcast journalism and sees no personal reason to learn about programming. Kathy is interested in becoming a food technician and thinks that her work will not involve much time working with computers. Other students are disposed to like 12CPS because of perceived congruence between their vocational interests and the course content and/or a fascination with computers *per se*.

The expectations of students, and consequently their experiences of IT courses, are influenced by gender relations. Gender, the social construction of sex, is a potent force in students' experiences of specialist IT classes at KHS, albeit in subtle ways. There is nothing essential about gender as observed in the experiences of students in CPS and TIM courses at KHS. Girls and boys do not necessarily like or dislike particular courses, topics, applications, or approaches to learning about computers. Nevertheless, there is a discernable gendered character to students' expectations and experiences at KHS.

In New Zealand and international research literature, persistent differences in male and female computing interests, preferences and practices are identified, which establishes gendered computing domains (Chen, 1986; Jackson, Ervin, Gardner, & Schmitt, 2001; McKinnon & Nolan, 1990; Ryba & Selby, 1995; Schumacher & Morahan-Martin, 2001). It is clear from the talk of KHS students that they identify different practices and subjects as masculine and feminine pursuits. Neither CPS nor TIM is seen as an exclusive domain of males or females, but different computer practices are associated with male and female work, and therefore the subjects acquire gendered identities. Students associate 12CPS with functions of the IT industry, computer science and computer engineering. It is seen as a course for students, male or female, that are interested in what have traditionally been masculine computer interests. In contrast, TIM is associated with traditional female computer activities. It is strongly identified with office practice and communication functions, despite curriculum changes that have broadened the scope of TIM and moved it away from its typing antecedence. The students regularly refer to TIM courses as "typing" and associate them with female work, as epitomised in the following excerpt.

Interviewer: Do you think in general there are any interest areas then that girls have that boys tend not to and *vice versa*?

Beth: I hate to say it, but typing. Because in our class [12TIM] there were no boys. Last year there was two but no\_ four! But by the end of the year there was only one left...

Winifred: They think it's a girlie thing, eh?

Beth: Yeah.

Winifred: Think typing is just for girls, I think.

Beth: It is like in the sixties you would get like mainly female secretaries and things like that.

At a personal level, individual students negotiate their gender identities as computer users, which dispose individuals to favour particular computing practices or applications. They negotiate different feminine or masculine identities, which are defined in part by the technological competencies and work roles to which they aspire. The images of self that have been negotiated by the boys in this study do not include being secretaries and doing what has traditionally been female work involving keyboarding/typing. In contrast, girls show broader interests, which encompass the traditional female domain of secretarial work and the masculine domain of programming. This identity formation influences students' experiences of CPS and TIM courses and their judgments as to their efficacy. For some students it disposes them to value the knowledge gained in a course because it connects to their gendered interests and work aspirations. It also leads to tension when there is a disjunction between the personal gender identity a student has constructed for him or herself as a computer user and his or her experience of a particular course. For example, Kathy and Lisa in 12CPS both reveal identities as computer users who are interested primarily in more traditional (female) communication functions and they are disgruntled with the (male) programming and mathematical components of 12CPS. In contrast, Joanna actively resists traditional gender roles and any association with TIM or typing, expressing enjoyment of and a desire to gain programming knowledge.

### ***Prior experience***

Prior experience with computers helps to define students' current experience of IT courses. Individuals are more or less familiar with the hardware and software that is used in CPS and TIM courses, depending on what hardware and software they have used at home or at friends' houses or in other subjects and IT courses. Their prior experience affects their attitudes and self-efficacy when using computers in CPS and TIM classes.

For example, Gini is more familiar with a Macintosh computer, which she has at home, and she expresses discomfort at having to use a PC in 12TIM.

Gini: Well like knowledge of the computer, like knowing where things are I can do real easy. I mean I have been brought up with computers at home and I just, I love fiddling round and finding new things but when it comes to the typing, drawing and stuff I'd probably kill myself... I like get stuck with, especially with the new ones [PCs] now in there. You know, I just sit there and I just look and like, huh... I find it easier to use the one at home for writing and stuff.

It is the idiosyncrasies of the software that are a source of Gini's frustrating experiences in 12TIM. Having to spend time to learn how to perform some functions with the unfamiliar software is a source of aggravation, especially when compared with the relative ease with which she feels she can use the similar software on her home computer.

Kathy similarly expresses frustration with applications with which she is unfamiliar and has little if any previous experience, including programming and spreadsheets. She uses her home computer primarily for communication functions, for word processing and to access the Internet. She feels confident of her ability with word processing component of the 12CPS course, which she considers to be easy and for which she has achieved her best assignment results. Kathy's previous experience and familiarity with word processing contributes to her enjoyment of this aspect of the course, the converse being the case for some other components.

Familiarity breeds confidence. As a result of their out-of-class activities, some students have greater knowledge and confidence than others, which they can utilise to solve problems and complete tasks in-class. For instance, in classroom observations of 12CPS two boys, Mason and Scott, appear to be more inclined to use the computer help menu when faced with problems. It is no surprise that these two boys have hobby interests and prior experience in the technical aspects of computing, in building computers, loading software and in computer gaming. Scott professes to being a computer hacker. These students have prior knowledge and appear to enjoy trying to solve problems on their own. They are confident of their ability and self-assured. Thus, even if software is new to students, their prior experience with computers can engender confidence to overcome problems.

## *Pedagogy*

Both the CPS and TIM courses have a “how to”, technocratic construction. Lessons typically involve long periods of time where the students engage independently in activities from a textbook or task sheets, which introduce them to new applications and functions and give them practice at using these functions through incrementally more complex tasks. The pedagogy employed by the teachers emphasises individual work, where the prime classroom relationship is between the computer and the user. This does not mean, however that students work alone. They regularly and voluntarily engage in parallel learning, where they work alongside their peers and consult with them about activities.

The technocratic construction of lessons is not an issue with the students. They are happy with this, or at least they do not question this lesson structure and focus. They chose to take IT courses because they wanted to learn how to use computers. Nevertheless, the way that the independent work is organised, such as the pacing of activities, is received differently by individuals.

Some students relish opportunities to work independently and at their own pace for an extended period. These tend to be the higher achievers who are confident of their computing abilities and who enjoy the personal challenge of independent work. Harriet in 10TIM, for example, would like there to be more reference sheets supplied so that she can get on with the activities and work ahead of the class. Others, though, find the emphasis on independent and self-paced work a source of dissatisfaction and anxiety. Kathy in 12CPS would like more direct teaching, with the teacher providing more in the way of whole class instruction. She wants the class to work at a more consistent pace, which she thinks would be achieved by having the work organised into smaller chunks. She is conscious that she is lagging behind others in respect of work completion and feels disadvantaged by the structure of the lessons, which leaves students working independently through a sequence of worksheets for days or weeks on end.

The teacher is an important resource for students in the CPS and TIM courses. A common strategy for problem solving is to ask their peers or the teacher what to do. This means that access to the teacher, or lack of access, becomes an issue for students that impinges on their experience of a course. For example, amongst the 12CPS students a recurring theme was concern that they didn't get enough assistance from the teacher and might have to wait long



periods of time to get this assistance. Even Mason, who enjoys the emphasis on individual endeavour in 12CPS and likes the way 12CPS is organised, expresses frustration at not getting teacher assistance when he needs it, given the demands of others who also want help from the teacher.

Another pedagogical factor that influences students' experiences is opportunities to engage with material in context. This, though, is more significant for some students and groups than for others. The girls in 12TIM seem to be more inspired by the context of activities and the end use of applications than are a number of students in 12CPS. Gini in 12TIM welcomes the opportunity to find information about the Olympics in her research project, using the Internet to access information. Similarly, Emma is interested in fashion and motivated by being given freedom of choice regarding the topic, the type information to record and the style of language to use in the reporting of that information. In contrast, the context of activities is more or less irrelevant to students in 12CPS whose interests are in computers-as-machines, rather than computers-as-tools.

### *Classroom relationships*

The nature of classroom relationships influence students' choices of subjects and their attitudes towards IT courses. Classroom relationships are a relatively strong influence for the girls in 12TIM, which contributes to their positive experiences of the 12TIM course. In particular, the girls highlight their relationship with their teacher, Mrs Keal, as a positive factor in their experience. They look on 12TIM as a safe, warm, nurturing environment and talk of a special relationship with their teacher.

Beth: ...And then in fourth form we, I had Miss Keall, and I just absolutely loved her. So it's\_ It was also her. Not just because I liked typing but it was, I think it was mainly her because she made it so fun and she was so nice...There is just something about Mrs Keall.

Winifred: A bond that she creates with us.

Beth: Yeah. Even like you have only known her this year.

Winifred: Yeah.

Beth: But it's like you have known her your whole life... Just something about her.

The girls in 12TIM describe Mrs Keall as "motherly" and as a "friend". They find her supportive and approachable. They identify with her.

Relationships with peers are also a factor in students' enjoyment of 12TIM. They describe the class as "friendly" and indicate that they all "get on." For Winifred, a newcomer to KHS, the

12TIM class is a source of valued friendships. She jokes that her only friends at KHS are in 12TIM, signalling that she feels particularly comfortable and accepted by the girls in 12TIM. Girls in 12TIM describe a different atmosphere in their all-female class compared with previous experience of mixed gender TIM classes, where there are fewer distractions and a more nurturing environment. The all-female class was not a factor in subject selection because there was no promise that 12TIM would be an all-female group, but the all-female gender dynamic is a positive factor in the girls' experiences of 12TIM.

In contrast, classroom relationships appear to be less significant as a factor in 12CPS students' subject selections. The teacher, Mr Lucas, does not appear to be such an influential factor in students' selection of CPS as a current and future course option – at least the teacher does not feature as a reason in students' responses when they are asked why they chose to take 12CPS. Similarly, though, students acknowledge the social climate, peer-peer relationships and relationship with the teacher as affective factors in their experiences of 12CPS. Some particularly relish engaging in verbal banter and sparring with Mr Lucas and peers.

In 10TIM a source of frustration or discomfort for some students is the behaviour of groups, particularly boys, who are inattentive and fool around in class, distracting others and commanding teacher time. This appears to take the edge off some students' enjoyment of the class, but it isn't something that students focus on. They are used to such behaviour and are observed to largely ignore it.

Thus, students' interpersonal relationships and the social and gender dynamics of the classroom are a part of their experiences of specialist IT courses. They interpret events and interactions in the classroom differently, depending how much they feel a part of particular social groups and how closely they relate to the teacher and their peers.

### ***Performance***

Students' experiences of CPS and TIM courses are influenced by the results that are achieved for assessments and perceptions of their performance. Gini, for example, makes negative comparisons between her results in 12TIM compared with her peers and she is less enthusiastic about the course than are others in the class. Mason, in comparison, is achieving well in 12CPS, in marked contrast with his experience in English, and he consequently has a favourable view of 12CPS. However, students' performance in specialist IT courses does not

determine that they will construe their experiences in positive or negative terms, poor results meaning a negative experience and good results a positive experience of a course. Rawiri thinks he is failing in 10TIM and that it is not a subject for him, but he struggles to identify negative experiences of the course. Winifred describes a disappointing performance for assessments in 12TIM, but she is effusive in her liking for the course, “I just absolutely love it.” In contrast, Lisa is disgruntled with 12CPS even though she is achieving good results, amongst some of the best in the class.

Performance is one of a range of factors in students’ experiences and it may or may not have a strong influence on the meaning students make of their experiences in CPS and TIM course. The ameliorating influence of other factors, including expectations, prior experience, pedagogical practices and classroom relationships, means that there are disjunctions between students’ assessment of their performance and the construction they place on their experiences of specialist IT courses.

### **Learning from students’ experiences**

What does all this mean for teachers? At a personal level, students’ experiences of IT subjects can be seen to be highly variable. Different factors are of greater or lesser significance to individuals as positive or negative influences on their experiences. This presents a challenge and dilemma for teachers who are charged with developing and presenting courses. There are, however, some things that may be taken from an exploration of students’ experiences of specialist IT courses at KHS that may inform teachers practice.

The significance of students’ expectations as a factor in their experiences suggests that teachers need to be aware of and address the match between students’ expectations and course aims overtly. The use and applicability of a course may need to be given as much attention as details of course content in information that is given out about courses. In the design and organisation of units, attention to context may help students to see the relevance of activities and connect personally with the material. Also, multiple and real life contexts in materials and learning tasks are necessary if some students are to broaden their horizons and see the relevance of activities and applications utilised in IT classes, and consequently attribute positive meaning to their classroom experience.

In relation to lesson organisation and structure, achieving a balance between whole-class, teacher-directed learning and independent work is desirable. Organisation of learning in IT classes in a manner that leaves students to work independently for extended periods of time may be well received by some students, but counter-productive for others. Whole class teaching at regular intervals is important to support students who may be less confident or unsure of material.

It is clear that the teacher is an important resource for students in IT classes, and that social and interpersonal factors are important in creating positive learning experiences for students. This supports similar findings by New Zealand researchers in other contexts (Alton-Lee, 2003; Bishop, Merryman, Tiakiwai, & Richardson, 2003; Hill & Hawk, 1998). An IT teacher cannot be with all students at once. Facilitating peer-peer interactions through formal cooperative learning strategies may assist individuals and minimise disgruntlement for those who need teacher or peer help but cannot get it on demand, as well as reducing pressure on the teacher who is in constant demand.

Curriculum design is also an area that teachers may need to address. The pervasive influence of gender relations as a factor in students' experiences invites teachers to consider the role they may play in maintaining gender stereotypes in the types of courses that they offer, albeit unconsciously and unintentionally. Where courses are aligned with traditional gender roles and computer uses, students attribute them a gendered character. A course may be an anathema to students who resist particular gender identified computing practices. If teachers desire to break down gender stereotypes, efforts may need to be made to confound these stereotypes by removing divisions between CPS, TIM and other IT courses, merging and creating new courses that confuse gender distinctions. This may involve quite a radical re-conception of IT courses. The American Association of University Women Educational Foundation Commission on Technology, Gender, and Teacher Education (2000) promotes new thinking about what is valued and constitutes information literacy in IT subjects. It advocates for a sophisticated understanding of technology and the acquisition of computing knowledge in authentic IT contexts that move away from traditional, gender defined courses. This provides food for thought for IT teachers in New Zealand as elsewhere. There is a challenge to teachers as developers of the curriculum in practice to look ahead, rather than back; to create new IT futures, rather than sustaining the courses and gendered IT practices of the past.

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